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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
BRUTUS, JOEL F	

ART UNIT	PAPER NUMBER
3768	

MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/586,177	TIMINGER ET AL.	
	Examiner	Art Unit	
	JOEL F. BRUTUS	3768	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 April 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-10* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 7-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rasche (US Pat: 6,473,635) stand alone.

Regarding claims 1, 7-10, Rasche teaches in FIG. 1 a patient who is arranged on a patient table and whose symbolically indicated heart is to be subjected to a treatment by means of a catheter introduced into the body [see column 3 lines 60-65] that anticipates the device and the method as claimed. Underneath the patient there is provided, for example integrated in the patient table, an RF receiving unit for the reception of the signals transmitted by the RF coil; the unit consists, for example, of an array with at least three adjacently arranged RF receiving coils. The catheter with the RF transmitter coil and the RF receiving unit are connected to an RF processing unit which constitutes a position measuring unit in conjunction with the RF transmitter coil and the RF receiving unit. The RF processing unit on the one hand controls the transmission of the RF signals by the coil and on the other hand evaluates the signals received by the RF receiving unit in order to calculate therefrom the position of the catheter in a fixed system of co-ordinates, for example, in the system of co-ordinates of the RF receiving unit; the position in space of the catheter is then determined therefrom

[see column 4 lines 1-15]. A reference probe which also includes RF transmission means, for example an RF transmitter coil, for transmitting RF signals is also connected to the RF processing unit; these signals can again be received by the RF receiving unit and the position in space of the reference probe can be determined therefrom [see column 4 lines 16-20].

The RF processing unit and the electrocardiography unit are connected to a control and arithmetic unit which controls said units and processes the data delivered thereby. Also connected to the control and arithmetic unit is a storage unit in which pre\-operatively acquired 3D image data sets of the patient are stored, that is, in this case image data of the cardiac region of the patient. Depending on the desired information and on the relevant application, such 3D image data sets may have been supplied by one or more medical imaging devices (image data acquisition unit) such as an X-ray device or a magnetic resonance tomography device. For such 3D image data sets to be suitable for the proposed method, however, it is necessary that the reference probe was already present in its present location during the acquisition of the 3D image data sets and that its position relative to the image data acquisition unit is known [see column 4 lines 28-41. The control and arithmetic unit then determines the position of the catheter relative to the heart from the data supplied and on the basis of the 3D image data sets present there can be derived an image of the anatomy surrounding the catheter in order to be displayed on a display device [see 4 lines 53- 57]. Because this operation is continuously possible during the treatment, by observing the images displayed (static image), in which each instantaneous position of the catheter or the catheter itself can be

superposed, the attending physician can thus see where exactly the catheter is situated. He or she can thus very accurately address given points, for example within the heart, because according to the proposed method the Eigen motion of the heart is taken into account for determining the position of the catheter relative to the heart [see column 4 lines 60-67]. 3D image data sets are acquired, and at the same time also the electrocardiogram of the patient, so as to be stored as an image data base in the storage unit [see column 5 lines 4-7].

Spatial positions of the catheter and of the reference probe are first measured by means of the position measuring unit while at the same time an electrocardiogram of the patient is recorded. Position of the catheter in the 3D image data set, and hence the position of the catheter relative to the heart for which image information is contained in the 3D image data set, is converted from the accurately measured spatial position of the catheter and of the reference probe, the selected 3D image data set and the information concerning the position of the reference probe relative to the 3D image data set. For this conversion the measured spatial position of the reference probe and the information concerning the position of the reference probe relative to the 3D image data set are used in such a manner that the position of the catheter relative to the reference probe is determined from the actually measured spatial positions of the catheter and the reference probe, after which it is taken up in the 3D image data set. Finally, an image of the heart on which the position of the catheter or the catheter itself is superposed can be determined from the selected 3D image data set [see column 5 lines 15-36].

Rasche discloses a respiratory motion sensor which monitors the respiratory motion of

the patient and measures a respiratory motion signal which is applied to the respiratory motion measuring unit. The respiratory motion sensor may be, for example an elastically deformable abdominal belt which, as in the present case, other means are also feasible in this respect, for example an ultrasound device or a resistance measuring device which is arranged at the area of the abdomen of the patient in order to measure the electrical resistance of the patient which varies because of the respiration [see column 6 lines 30-42]. The respiratory motion signal which is continuously measured during the measurement of the positions in space of the catheter and the reference probes is also applied to the control and arithmetic unit in which it is also taken into account in calculating the position of the catheter relative to the heart. This is advantageous because the catheter is also moved within the body by the respiratory motion of the patient, so that the position of the catheter relative to the reference probe changes but the position of the catheter relative to the heart does not change or only slightly so [see column 6 lines 40-50]. FIG. 5, during the treatment this respiratory motion signal can be continuously measured as a supplement to the electrocardiogram and be taken into account for calculating the position of the catheter relative to the heart. To this end, it is assumed that the position of the anatomy at the area of the heart changes by a fixed amount, in each respiratory motion phase a, relative to a given reference position relating to a given reference respiratory motion phase. These values can be acquired either on the basis of a model of the anatomy or be measured pre-operatively on the patient to be treated [see column 7 lines 1-50].

Rasche doesn't exactly teach a movement model describing spontaneous movement.

However, Rasche teaches the respiratory motion signal which is continuously measured during the measurement. The patient reference probe may also suffice to perform the function of the respiratory motion sensor and the respiratory motion measuring unit [see column 6 lines 42-58]. As has been described with reference to FIG. 5, during the treatment this respiratory motion signal A can be continuously measured as a supplement to the electrocardiogram and be taken into account for calculating the position of the catheter relative to the heart. To this end, it is assumed that the position of the anatomy at the area of the heart changes by a fixed amount, in each respiratory motion phase a, relative to a given reference position relating to a given reference respiratory motion phase. These values can be acquired either on the basis of a model of the anatomy or be measured pre-operatively on the patient to be treated. Moreover, such a respiratory motion signal can already be acquired during the pre-operative acquisition of the 3D image data sets, so that the 3D image data sets are associated not only with the individual phases of motion of the electrocardiogram but also with individual phases of motion of the respiratory motion, so that a five-dimensional data set (3D image data set+cardiac motion phase+respiratory motion phase) is then stored in the image data base [see column 7 lines 15-35].

Therefore, one with ordinary skill in the art would have been motivated to modify the Rasche reference by using the motion and the motion measuring unit as taught by

Rasche and implement it into the data processor; because motion sensor or motion measuring unit would be able to provide spontaneous movement.

3. Claims 2-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rasche (US Pat: 6,473,635) in view of Branham et al (US Pat: 5,687,737).

Regarding claims 2-6, all other limitations are taught as set forth above by Rasche.

Rasche doesn't teach using measured values of interpolation nodes.

However, Branham et al teaches an electro physiologic mapping system for mapping arrhythmia surgery and cardiac research that allows rapid interpretation of cardiac activation sequence. 3D model of the heart and viewing characteristics [see abstract]. Branham et al teaches in fig 1 a data processing, graphic workstation; two computer programs; interpolation splining [see column 18 lines 38-50].

Therefore, it would have been obvious to one with ordinary skill in the art at the time the invention was made to combine these references; for the purpose of providing of constructing a smoother and a simpler representation.

Response to Arguments

4. Applicant's arguments with respect to claims 1-10 have been considered but are moot in view of the new ground(s) of rejection. The claim objection is moot due to the amendment.

Applicant argues that Rasche doesn't exactly teach a movement model describing spontaneous movement.

However, Rasche teaches the respiratory motion signal which is continuously measured during the measurement. The patient reference probe may also suffice to perform the function of the respiratory motion sensor and the respiratory motion measuring unit [see column 6 lines 42-58]. As has been described with reference to FIG. 5, during the treatment this respiratory motion signal A can be continuously measured as a supplement to the electrocardiogram and be taken into account for calculating the position of the catheter relative to the heart. To this end, it is assumed that the position of the anatomy at the area of the heart changes by a fixed amount, in each respiratory motion phase a, relative to a given reference position relating to a given reference respiratory motion phase. These values can be acquired either on the basis of a model of the anatomy or be measured pre-operatively on the patient to be treated. Moreover, such a respiratory motion signal can already be acquired during the pre-operative acquisition of the 3D image data sets, so that the 3D image data sets are associated not only with the individual phases of motion of the electrocardiogram but also with individual phases of motion of the respiratory motion, so that a five-dimensional data set (3D image data set+cardiac motion phase+respiratory motion phase) is then stored in the image data base [see column 7 lines 15-35].

Therefore, one with ordinary skill in the art would have been motivated to modify the Rasche reference by using the motion and the motion measuring unit as taught by

Rasche and implement it into the data processor; because motion sensor or motion measuring unit would be able to provide spontaneous movement.

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOEL F. BRUTUS whose telephone number is (571)270-3847. The examiner can normally be reached on Mon-Fri 7:30 AM to 5:00 PM (Off alternative Fri).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Long Le can be reached on (571)272-0823. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J. F. B./
Examiner, Art Unit 3768

/Long V Le/
Supervisory Patent Examiner, Art Unit 3768